CLAIMS

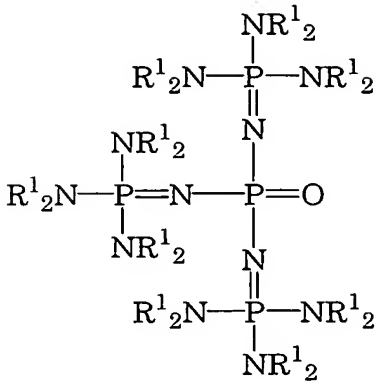
1. A thermosetting polyamide foam prepared by reacting a polyisocyanate compound with a polyester polycarboxylic acid using a compound having a P=N bond as a catalyst under conditions of an NCO index of not less than 1.6.

2. The thermosetting polyamide foam according to claim 1, wherein the polyester polycarboxylic acid has an acid value of not less than 20 mgKOH/g and not more than 70 mgKOH/g, and a hydroxyl number of not more than 1/8 of the acid value.

3. The thermosetting polyamide foam according to claim 1 or 2, wherein the NCO index is not less than 2.0 and not more than 3.0.

4. A method for producing a thermosetting polyamide comprising:

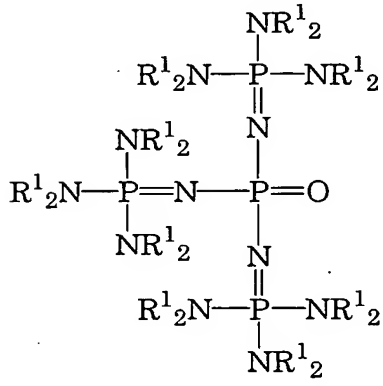
reacting a polyisocyanate compound with a polycarboxylic acid using a phosphine oxide compound represented by the following chemical formula (1):



• x(H_2O) (1)

wherein R^1's are independently a hydrocarbon group of 1 to 10 carbon atoms, and two R^1's on one nitrogen atom may bind to each other to form a cyclic structure; x, which denotes the amount of water contained in terms of molar ratio, is in the range of 0 to 5.0;

a phosphazenium salt of an active hydrogen compound represented by the following chemical formula (2):

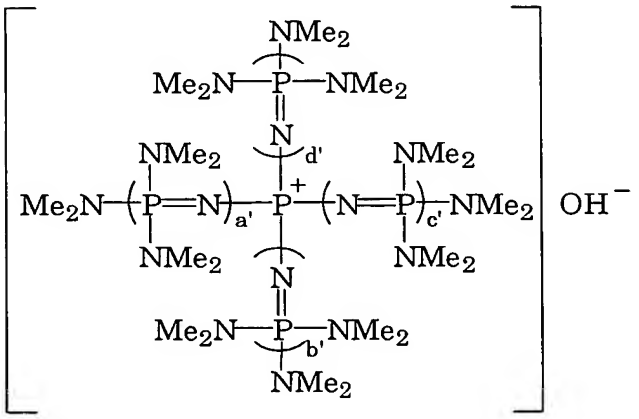


• x(H_2O) (2)

wherein n, which is the number of phosphazenium cation, is an integer of 1 to 8; Z^{n-} is an n-valent anion of an active hydrogen compound induced by elimination of n-protons from the active hydrogen compound having up to 8 active hydrogen atoms on an oxygen atom or on a nitrogen

atom; a, b, c and d are independently a positive integer of not more than 3 or zero, except that all of them can not be zero simultaneously; and R^2's are independently a hydrocarbon group of 1 to 10 carbon atoms, and two R^2's on one nitrogen atom may bind to each other to form a cyclic structure; or

a hydroxyl phosphazenium represented by the following chemical formula (3):



(3)

wherein Me is methyl; and a', b', c' and d' are independently 0 or 1, except that all of them cannot be zero simultaneously.

5. A thermosetting polyamide foam prepared by reacting a polyisocyanate compound with a polyester polycarboxylic acid using a catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam.

6. The thermosetting polyamide foam according to claim 5, wherein the service temperature of the thermosetting polyamide foam is not less than 130 °C and less than a decomposition temperature of the thermosetting polyamide foam.

7. The thermosetting polyamide foam according to claim 5, wherein the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam is used together with a tertiary amine compound catalyst.

8. The thermosetting polyamide foam according to claim 5, wherein the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam is used together with an alkali metal carboxylate catalyst and/or an alkaline-earth metal carboxylate catalyst.

9. The thermosetting polyamide foam according to claim 7 or 8, wherein the amount of the catalyst used in combination with the catalyst substantially decomposed at a service temperature of the thermosetting polyamide foam is less than 50 % by weight of the amount of the catalyst substantially decomposed at a service temperature of the

thermosetting polyamide foam.

10. A heat-resistant vibration damper comprising the thermosetting polyamide foam according to claim 1 or 5.

11. A heat-resistant sound absorbing material comprising the thermosetting polyamide foam according to claim 1 or 5.

12. A heat-resistant cushioning material comprising the thermosetting polyamide foam according to claim 1 or 5.